

Analysis of HEPfolk 2008 Census

1. Methodology

We instituted several changes to the 2008 Census web interface in order to make it easier to use with the goal of reducing mistakes and improving compliance. We also re-factored the database to make employment trends easier to track and make the database easier to maintain. Finally, we included information on gender for the first time in 2008. We emphasize that the totals reported in the census are people, not full-time-equivalents.

2. Validation of 2008 Census

As soon as the Census deadline passed, validation and consistency checking began. As in the past, there are instances of people being counted more than once. Some of these are due to people who hold joint appointments such as Princeton/IAS or Fermilab/Chicago. We did not attempt to remove these. There were “mistakes” at about the few percent level—common ones involved moves where a person is still listed at the old institution even after appearing at the new one or spelling mistakes that caused queries on names to fail. The main conclusion is that the total counts are not equal to the number of heads at the level of a few percent. The numbers in Figure 5 that track changes have much higher percentage uncertainties since the base numbers are much smaller.

3. Analysis of 2008 Census

a. Historical trends

The historical trends by title are shown in Figure 1.

The trends broken down by institute and field are shown in Tables 1-6.

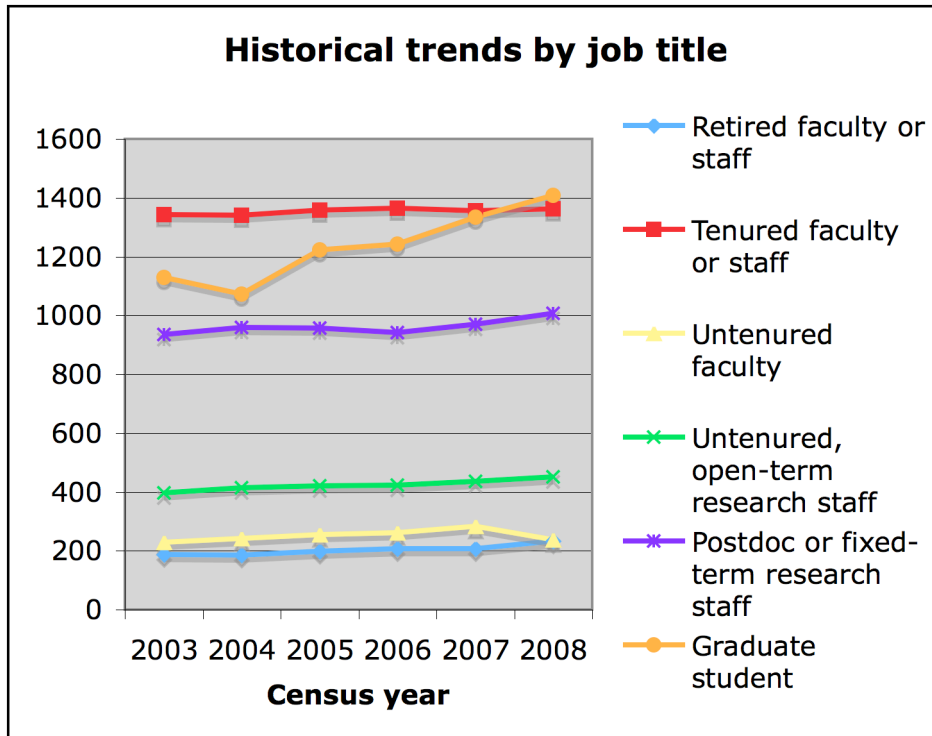


Figure 1. Number in each job category by year.

Table 1: Historical trend for full field

Full Summary					
Number of	2004	2005	2006	2007	2008
Institutions	156	153	156	153	153
People	4218	4200	4415	4589	4738

Number with job title	2004	2005	2006	2007	2008
Retired faculty or staff	185	199	208	208	233
Tenured faculty or staff	1341	1359	1364	1355	1363
Untenured faculty	242	255	261	284	238
Untenured, open-term research staff	415	421	422	436	451
Postdoc or fixed-term research staff	960	957	942	970	1008
Graduate student	1073	1223	1243	1335	1409
Other	2	1	1	0	14

Number with field (may select multiple)	2004	2005	2006	2007	2008
Theory	1289	1390	1407	1414	1486
Experiment	2563	2634	2650	2783	2800
Accelerator	467	498	494	517	539
No field specified	2	1	1	0	0

Table 2. Historical trend for Labs and Institutes (includes ANL, Bartol, BNL, FNAL, Institute for Advanced Study, Institute for Theoretical Physics, LBNL, LLNL, LANL, NASA Goddard, NASA Johnson, NSF, Naval Research Lab, Smithsonian, SLAC, and DOE)

Labs or Institutes					
Number of	2004	2005	2006	2007	2008
Institutions	13	14	14	16	16
People	1077	1115	1086	1142	1203

Number with job title	2004	2005	2006	2007	2008
Retired faculty or staff	63	69	74	76	84
Tenured faculty or staff	438	457	459	461	450
Untenured faculty	6	4	1	4	3
Untenured, open-term research staff	212	225	218	228	236
Postdoc or fixed-term research staff	301	284	279	303	344
Graduate student	57	76	55	70	72
No title specified	0	0	0	0	6

Number with field (may select multiple)	2004	2005	2006	2007	2008
Theory	161	158	158	175	192
Experiment	637	663	641	689	705
Accelerator	321	341	332	335	346
No field specified	0	0	0	0	0

Table 3. Historical trend excluding Labs and Institutes (i.e., Universities)

Labs or Institutes excluded					
Number of	2004	2005	2006	2007	2008
Institutions	143	139	142	137	137
People	3141	3085	3329	3447	3535

Number with job title	2004	2005	2006	2007	2008
Retired faculty or staff	122	130	134	132	149
Tenured faculty or staff	903	902	905	894	913
Untenured faculty	236	251	260	280	235
Untenured, open-term research staff	203	196	204	208	215
Postdoc or fixed-term research staff	659	673	663	667	664
Graduate student	1016	1147	1188	1265	1337
No title specified	2	1	1	0	8

Number with field (may select multiple)	2004	2005	2006	2007	2008
Theory	1128	1232	1252	1239	1294
Experiment	1926	1971	2012	2094	2095
Accelerator	146	157	162	182	193
No field specified	2	1	1	0	0

Table 4. Historical trend for Theory.

Theory field selected					
Number of	2004	2005	2006	2007	2008
Institutions	126	126	128	127	124
People	1289	1390	1407	1414	1483

Number with job title	2004	2005	2006	2007	2008
Retired faculty or staff	62	65	71	72	82
Tenured faculty or staff	481	477	477	466	469
Untenured faculty	100	106	105	110	96
Untenured, open-term research staff	24	26	22	24	27
Postdoc or fixed-term research staff	238	256	245	247	266
Graduate student	384	245	487	495	536
No title specified	0	0	0	0	4

Number with field (may select multiple)	2004	2005	2006	2007	2008
Theory	1289	1390	1407	1414	1486
Experiment	26	26	26	25	26
Accelerator	9	9	8	8	5
No field specified	0	0	0	0	0

Table 5. Historical trend for Experiment

Experiment field selected					
Number of	2004	2005	2006	2007	2008
Institutions	129	129	132	132	130
People	2563	2634	2650	2783	2800

Number with job title	2004	2005	2006	2007	2008
Retired faculty or staff	115	124	126	122	134
Tenured faculty or staff	745	761	767	770	773
Untenured faculty	138	143	150	164	131
Untenured, open-term research staff	286	276	288	304	312
Postdoc or fixed-term research staff	637	627	617	639	637
Graduate student	642	703	702	784	793
No title specified	0	0	0	0	9

Number with field (may select multiple)	2004	2005	2006	2007	2008
Theory	26	26	26	25	26
Experiment	2563	2634	2650	2783	2800
Accelerator	71	77	80	96	101
No field specified	0	0	0	0	0

Table 6. Historical trend for Accelerator

Accelerator field selected					
Number of	2004	2005	2006	2007	2008
Institutions	35	35	36	36	32
People	467	498	494	517	539

Number with job title	2004	2005	2006	2007	2008
Retired faculty or staff	16	18	18	22	22
Tenured faculty or staff	163	167	168	171	168
Untenured faculty	9	11	12	15	12
Untenured, open-term research staff	121	140	130	131	131
Postdoc or fixed-term research staff	99	90	91	100	114
Graduate student	59	72	75	77	84
No title specified	0	0	0	0	0

Number with field (may select multiple)	2004	2005	2006	2007	2008
Theory	9	9	8	8	5
Experiment	71	77	80	96	101
Accelerator	467	498	494	517	539
No field specified	0	0	0	0	0

b. Results for 2008 Census

The breakdown by PhD year for each job category is shown in Figures 2. The Postdoc plus Fixed-term Research Staff shows an approximately exponential decay (mean dwell time = 5 years) plus a long tail. The untenured faculty + open-term research category is surprisingly flat as many people linger in this category for decades.

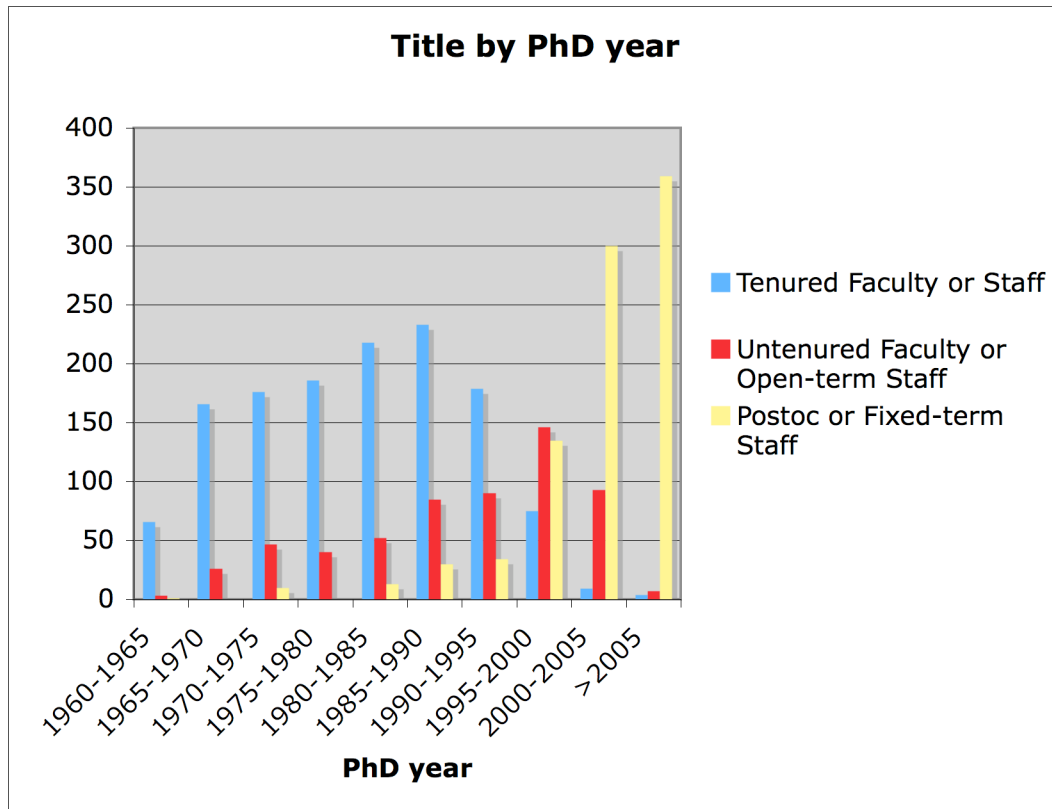


Figure 2. Positions by PhD year

The compliance on gender selection was very disappointing (only 80%) since we made a special effort to make it easy (genders could be set from a single page rather than having to edit individual pages).

For the sample where gender was reported, the percentage of women by job title is shown in Figure 3. The percentage by PhD year is shown in Figure 4. In both cases, while the average percentage is low (11%) there is a clear trend that the percentage is improving with time.

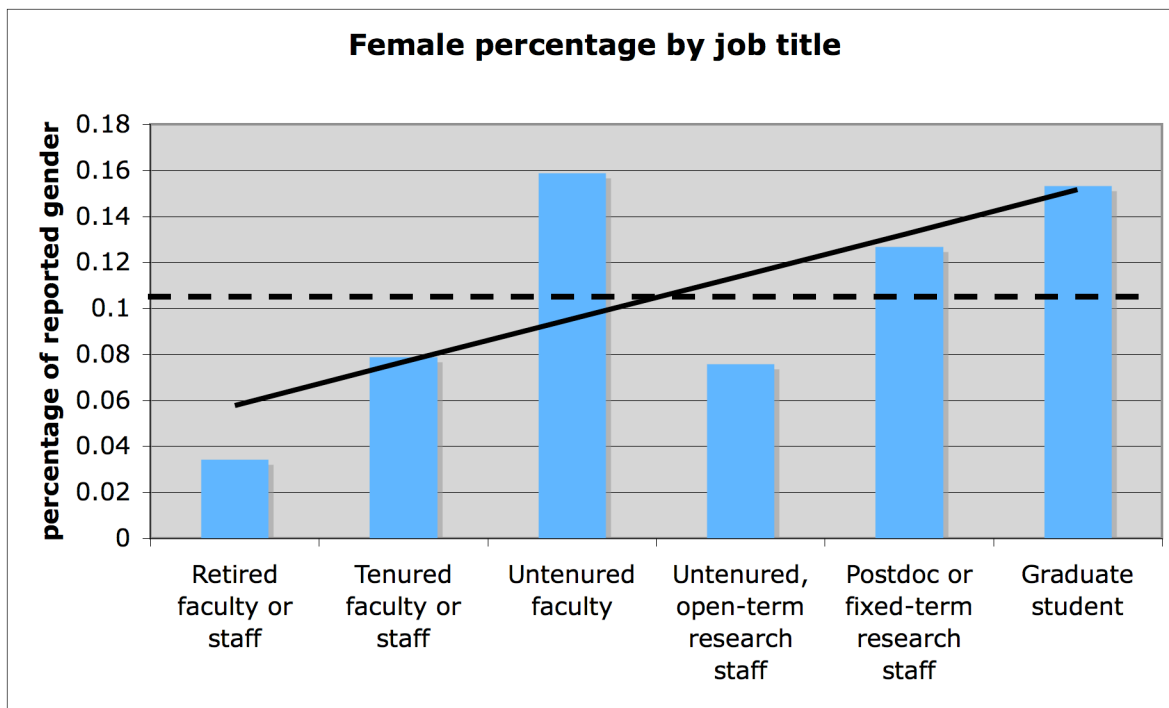


Figure 3. Percentage of women by job title. The solid line is a linear regression fit and the dotted line is the sample average.

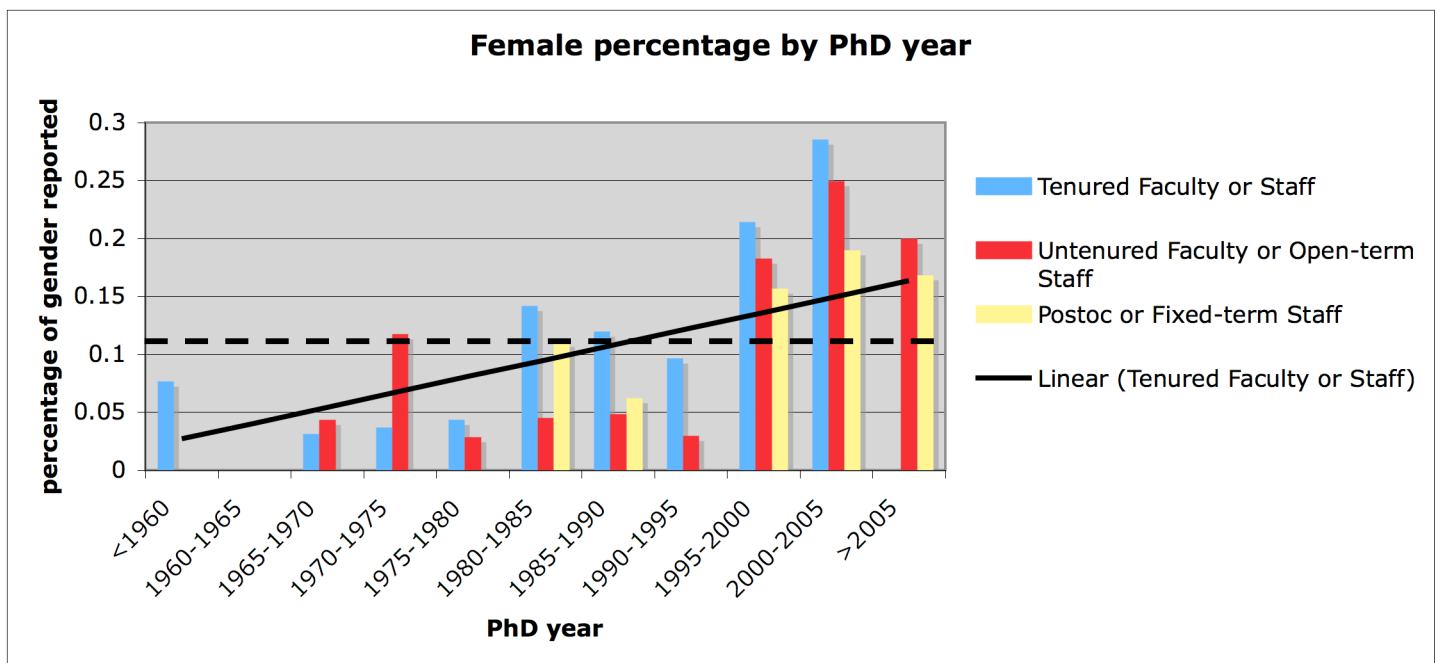


Figure 4. Percentage of women by PhD year and job title. The solid line is a linear regression fit to the Tenured category and the dotted line is the sample average.

The flow among the job categories is summarized in Figure 5. As a guide to following Figure 5, consider the Grad Student category. The broad arrow at the bottom indicates that 397 new graduate students entered in 2008. The arrow above the category shows that 86 students graduated and took a postdoc job at a US HEP institution. The smaller arrows to the side show that: 34 students took a job at a Foreign institutions, and 231 took jobs either in other categories (including unknown or unspecified destinations).

Figure 5 shows a number of remarkable features:

- In spite of the approximately constant year-to-year sums, there is considerable movement in each year. It is as if there were an approximately fixed number of slots in each category with a “musical chair” exchange each year. The total movement is larger than shown in Figure 5 since lateral moves within a job category are not shown.
- The attrition rate is severe in moving up the job category pyramid. Less than 10% of entering graduate students can expect to achieve a tenured position in US HEP institutions. This census year showed a large upward fluctuation in tenured appointments (55). The long term average is about 30.
- The Foreign Institutions are a crucial piece of the full picture. The flow between the US and Foreign institutions is approximately balanced.
- Industry and non-HEP institutions take up the attrition. The “non-HEP” component includes small US universities with no HEP program (typically teaching rather than research universities). The detailed breakdown is shown in Table 7. The “Other” category includes deaths and retirements, hence the seemingly large percentage for the Tenured category. Here “Engineering” means academic engineering as distinct from “Industry”.
- The “Unknown” category is still large enough to prevent very precise accounting of flow each year. The problem is particularly acute in the case of entering graduate students, making separation into US and Foreign impossible.
- It is clear that departing HEP graduates support US industry and other fields.

Table 7. Departure destinations by job title with detailed breakdown for non-HEP.

Departure table	Graduate Student	Postdoc fixed-term research or	Untenured faculty, open term research	Tenured faculty, research staff
HEP	155	163	23	10
Other physics	13	1	1	
Life sciences	11	3	1	
Teaching	13	3		1
Industry	39	19	1	
Engineering	2	2		
Other science	9	4	1	
Other	23	11	3	28
Unknown	121	79	18	4

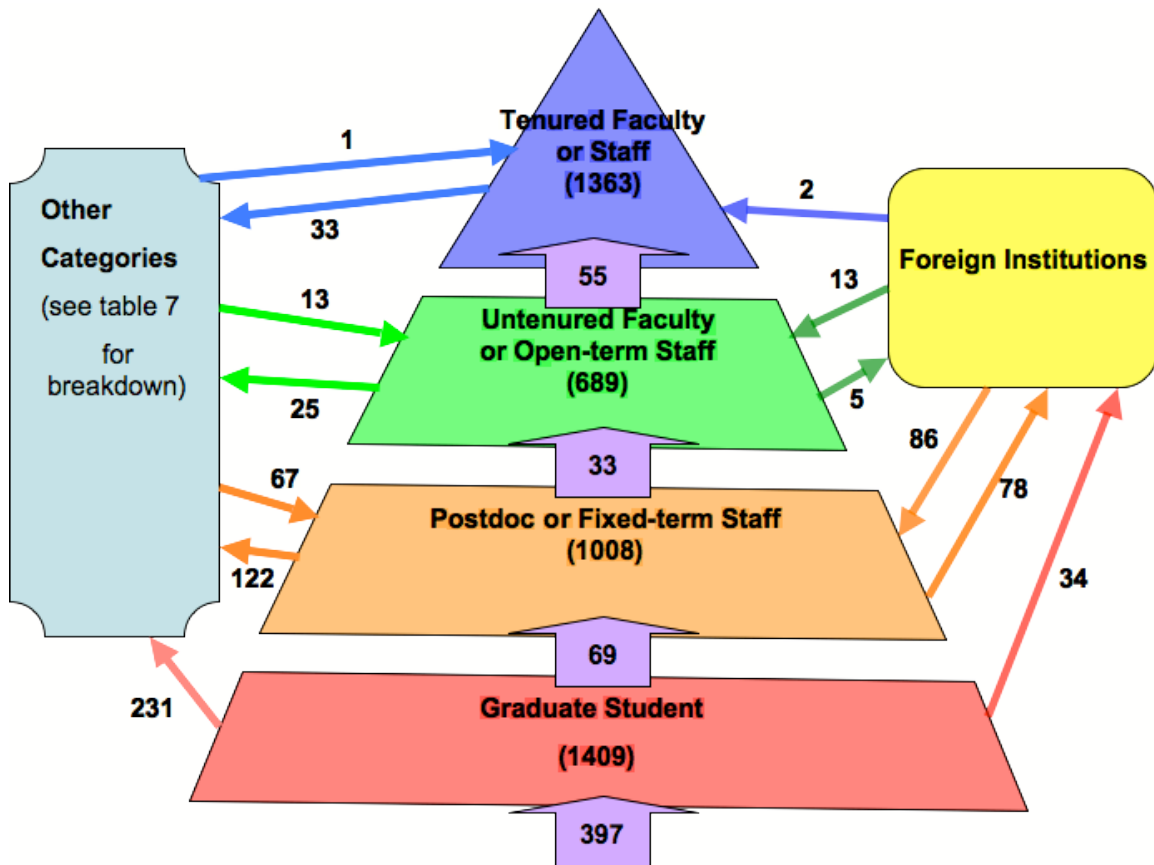


Figure 5. Job category flow

